CLAIMS

1. A white light emitting diode (LED) device comprising:

an LED chip mounting member for mounting an LED chip;

one or more than blue LED chips or ultraviolet LED chips mounted on the LED chip mounting member;

a first mold having a transparent epoxy resin and a first phosphor and sealing the blue or ultraviolet LED chips, the first phosphor dispersed in the transparent epoxy resin to convert light emitted from the blue or ultraviolet LED chips into first light having a first wavelength; and

a second mold having a transparent epoxy resin and a second phosphor and formed on the first mold, the second phosphor dispersed in the transparent epoxy resin to convert light emitted from the blue or ultraviolet LED chips into second light having a second wavelength, the second light being white light obtained by combination of the emitted light and the first light.

2. The device of claim 1, wherein the device has the blue LED chip, the first phosphor converts the emitted light into red light, and the second phosphor converts the emitted light into green light.

3. The device of claim 2, wherein each of the first phosphor and the second phosphor account for 1% to 20% of the weight of their respective mixtures with the transparent epoxy resin.

4. The device of claim 2, wherein a thickness of the first mold is 10% to 90% of a combined thickness of the first mold and the second mold.

5. The device of claim 1, further comprising a bonding wire for electrically connecting the blue or ultraviolet LED chips with an external connection terminal.

6. A method of manufacturing a white LED device, the method comprising:

mounting one or more than blue LED chips or ultraviolet LED chips on an LED chip mounting member;

forming a first mold having a transparent epoxy resin and a first phosphor to seal the blue LED chips or the ultraviolet LED chips, the first phosphor dispersed in the transparent epoxy resin to convert light emitted from the blue or ultraviolet LED chips into first light having a first wavelength; and

forming a second mold having a transparent epoxy resin and a second phosphor on the first mold, the second phosphor dispersed in the transparent epoxy resin to convert light emitted from the blue or ultraviolet LED chips into second light having a second wavelength, the second light being white light obtained by combination of the emitted light and the first light.

7. The method of claim 6, wherein the forming of the first mold and the forming of the second mold each comprise:

first mixing a main gradient with a curing agent at room temperature to provide a liquid-phase epoxy resin;

first semi-curing the liquid-phase epoxy resin at a temperature of 70℃ to 100℃ and a pressure of 1torr to 30torr;

adding and second mixing the first phosphor with the semi-cured liquid-phase epoxy resin at room temperature to prepare a first base resin having the mixed first phosphor;

adding and second mixing the second phosphor with the semi-cured liquid-phase epoxy resin at room temperature to prepare a second base resin having the mixed second phosphor;

molding and surrounding the mounted blue or ultraviolet LED chip with the first base resin;

second curing the first base resin at a temperature of more than 120℃ and atmospheric pressure to form the first mold;

molding the first mold with the second base resin; and

second curing the second base resin at the temperature of more than 120℃ and atmospheric pressure to form the second mold.

8. The method of claim 7, wherein the preparing of the base resin is performed using a potting technique or a screen pattern mask technique.

9. The method of claim 7, wherein in the first mixing, the first phosphor or the second phosphor is further added and mixed, and the first base resin is formed using the liquid-phase epoxy resin mixed with the first phosphor and semi-cured, and the second base resin is formed using the liquid-phase epoxy resin mixed with the second phosphor and semi-cured.

10. The method of claim 6, wherein the forming of the first mold and the forming of the second mold are performed by a transfer-molding technique using, respectively, a transparent epoxy resin tablet mixed with the first phosphor and a transparent epoxy resin tablet mixed with the second phosphor.

11. The method of claim 6, wherein the white LED device has the blue LED chips, the first phosphor converts the emitted light into red light, and the second phosphor converts the emitted light into green light.

12. The method of claim 11, wherein each of the first phosphor and the second phosphor account for 1% to 20% of the weight of their respective mixtures with the transparent epoxy resin.

13. The method of claim 6, wherein the thickness of the first mold is 10% to 90% of the combined thickness of the first mold and the second mold.

14. The method of claim 6, after the adhering of the chip, further comprising:

bonding a wire to electrically connect the blue or ultraviolet LED chips with an external connection terminal.